

## PATENT ABSTRACTS OF JAPAN

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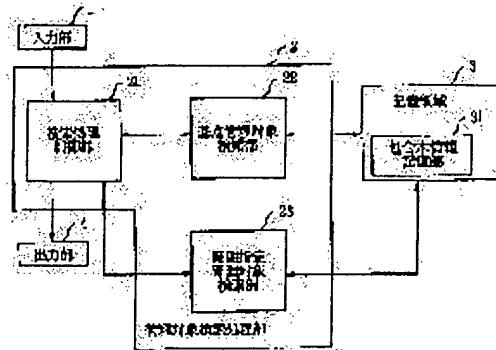
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## (54) RETRIEVAL PROCESSOR FOR OBJECT OF MANAGEMENT

## (57) Abstract:

PURPOSE: To shorten the processing time of multiple management objects retrieval by a network management system.

CONSTITUTION: This processor is equipped with a class inclusion tree information storage part 31 which stores information on a class inclusion tree, a retrieval process control part 21 which controls a retrieval process, a base point management object retrieval part 22 which retrieves a pointer to a node in the class inclusion tree information storage part corresponding to a base point management object name and a pointer to its control object, a range specification management object retrieval part 23 which retrieves a pointer to a management object corresponding to the obtained base point information and range specification mode. Further, the data structure of the class inclusion tree information storage part 31 has a Left-next item and a Right-next item which relate child nodes having the same parent node in the class inclusion tree in two ways by the chain of pointers, a Left-cousin item and a Right-cousin which relate the chains on the same level of the class inclusion tree in two ways by the chain of pointers, and a Left-child item and a Right-child item which store pointers to both end nodes of the chain of the child nodes at a parent node.



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**CLAIMS**

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[Claim(s)]

[Claim 1] The inclusion tree information storage section which memorized the information on the inclusion tree in a network management system, The retrieval processing control section which controls the retrieval processing corresponding to the radix point administration object name and range assignment mode which are given from the input section, The radix point administration object retrieval section which reads the 2nd pointer in which the location of the stereo of the administration object memorized by the 1st pointer in which the location of the node of said inclusion tree information storage section corresponding to said radix point administration object name acquired in this retrieval processing control section is shown, and its node is shown, In said 1st pointer in which the location of the node of said inclusion tree information storage section corresponding to said radix point administration object name acquired in this radix point administration object retrieval section is shown, and said retrieval processing control section The administration object retrieval processor characterized by having the range assignment administration object retrieval section which reads the 3rd pointer in which the location of the stereo of two or more administration objects corresponding to said obtained range assignment mode is shown.

[Claim 2] The left-NEKISUTO (Left-next) item and light-NEKISUTO (Right-next) item by which said inclusion tree information storage section connects a child node with the same parent node bidirectionally for the inclusion relation in the inclusion tree of an administration object with the chain of the 4th pointer, The left-cousin (Left-cousin) item and light-cousin (Right-cousin) item which connect bidirectionally two or more chains bidirectionally connected with said 4th pointer on the same level in said inclusion tree with the chain of the 5th pointer, In a parent administration object The administration object retrieval processor according to claim 1 characterized by having DS including the left-chilled (Left-child) item and light-chilled (Right-child) item which memorize the 6th pointer to the both-ends administration object of the chain of a child administration object.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Industrial Application] Especially this invention relates to the administration object retrieval processor in the network management system of the OSI managed model of open systems interconnection (it is hereafter described as OSI) about an administration object retrieval processor.

#### [0002]

[Description of the Prior Art] Two or more pair elephant optional feature made into the object of processing of the management information (it is hereafter described as an administration object) by which range assignment was carried out as a functional unit of the common management information service (it is hereafter described as CMIS) of OSI management exists. Range assignment on the tree (it is hereafter described as an inclusion tree) for managing the identifier of the administration object in a system uniquely hierarchical As opposed to the subtree which uses a radix point as a root on the basis of one node of arbitration "Only a radix point" Only (it is hereafter described as the range assignment mode 1), and "the node of a radix point to 1 level low order" (It is hereafter described as the range assignment mode 2), "the node of all the subtrees containing a radix point" The range assignment mode of (it is hereafter described as the range assignment mode 3), "the node of a radix point to n level low order" (it is hereafter described as the range assignment mode 4), and "the node of the subtree to n level low order containing a radix point" (it is hereafter described as the range assignment mode 5) exists.

[0003] This kind of administration object retrieval processor makes an input value conventionally the radix point identifier and range assignment mode which show a radix point for the retrieval to the node by which range assignment was carried out as mentioned above. First, it had become the configuration performed hierarchical from a radix point also to the node to which the inclusion tree searched originally inclusion Kigami's node specified by the radix point identifier hierarchical, next the above-mentioned range assignment was carried out on the subtree below a radix point.

#### [0004]

[Problem(s) to be Solved by the Invention] Since it needed to refer to this conventional administration object retrieval processor by inclusion Kigami in the retrieval in the case of the range assignment mode 4 via all the nodes to n level low order of the subtree which uses a radix point as a root, there was a trouble that the processing time started too much.

#### [0005]

[Means for Solving the Problem] The inclusion tree information storage section which memorized the information on an inclusion tree [ in / in the administration object retrieval processor of this invention / a network management system ], The retrieval processing control section which controls the retrieval processing corresponding to the radix point administration object name and range assignment mode which are given from the input section, The radix point administration object retrieval section which reads the 2nd pointer in which the location of the stereo of the administration object memorized by the 1st pointer in which the location of the node of said inclusion tree information storage section corresponding to said radix point administration object name acquired in this retrieval processing control

section is shown, and its node is shown, In said 1st pointer in which the location of the node of said inclusion tree information storage section corresponding to said radix point administration object name acquired in this radix point administration object retrieval section is shown, and said retrieval processing control section It has the range assignment administration object retrieval section which reads the 3rd pointer in which the location of the stereo of two or more administration objects corresponding to said obtained range assignment mode is shown.

[0006] The administration object retrieval processor of this invention moreover, said inclusion tree information storage section The left-NEKISUTO (Left-next) item and light-NEKISUTO (Right-next) item by which a parent node connects the same child node bidirectionally for the inclusion relation in the inclusion tree of an administration object with the chain of the 4th pointer, The left-cousin (Left-cousin) item and light-cousin (Right-cousin) item which connect bidirectionally two or more chains bidirectionally connected with said 4th pointer on the same level in said inclusion tree with the chain of the 5th pointer, It has DS including the left-chilled (Left-child) item and light-chilled (Right-child) item which memorize the 6th pointer to the both-ends administration object of the chain of a child administration object in a parent administration object.

[0007]

[Example] Next, this invention is explained with reference to a drawing.

[0008] Drawing 1 is the block diagram showing one example of this invention.

[0009] In drawing 1 the administration object retrieval processor of this example The retrieval processing control section 21 which controls the retrieval processing corresponding to the inclusion tree information storage section 31 which memorized the information on an inclusion tree, and the radix point administration object name and range assignment mode which are given from the input section 1, The radix point administration object retrieval section 22 which reads the 2nd pointer in which the location of the stereo of the administration object memorized by the 1st pointer in which the location of the node of the inclusion tree information storage section 31 corresponding to the radix point administration object name acquired in the retrieval processing control section 21 is shown, and its node is shown, In the 1st pointer and retrieval processing control section 21 which show the location of the node of the inclusion tree information storage section 31 corresponding to the radix point administration object name acquired in the radix point administration object retrieval section 22 It has the range assignment administration object retrieval section 23 which reads the 3rd pointer in which the location of the stereo of two or more administration objects corresponding to the obtained range assignment mode is shown.

[0010] Drawing showing the inclusion tree of an administration object [ in / in drawing 2 / this example ], drawing showing the DS of the inclusion tree information storage section [ in / in drawing 3 / this example ], and drawing 4 are drawings showing the physical configuration of the inclusion tree information storage section in this example.

[0011] Next, the DS of the inclusion tree information storage section in this example is explained with reference to drawing 1 , drawing 2 , drawing 3 , and drawing 4 .

[0012] In drawing 2 , each node of an inclusion tree is a relative identifier for discriminating an administration object from a wooden high order relatively, and each work of an inclusion tree shows the inclusion relation between administration objects. Thereby, name management of the administration object of arbitration is carried out by the absolute identifier by the train of the relative identifier from the root (it is hereafter described as ROOT) of an inclusion tree. DS 310 of the inclusion tree information storage section of drawing 3 The RDN item which memorizes a relative identifier as a data item, and the MO-pointer item which memorizes the pointer to the stereo of an administration object, The Left-next item and Right-next item from which a parent node connects the same child node bidirectionally in the chain of a pointer by the inclusion tree the pointer hereafter memorized by the Left-next item -- a Left-next pointer -- the pointer memorized by the Right-next item -- the chain of a Right-next pointer and the pointer of a child node -- a twin node chain -- describing -- The Left-cousin item and Right-cousin item which connect the twin node chains of the same level bidirectionally with the chain of a pointer the pointer hereafter memorized by the Left-cousin item -- a Left-cousin pointer -- the pointer memorized

by the Right-cousin item -- the chain of a Right-cousin pointer and a twin node chain -- a cousin chain -- calling -- The Left-child item and Right-child item which memorize the pointer to the both-ends node of the twin node chain of a child node in a parent node (The pointer memorized by the Left-child pointer and the Right-child item in the pointer memorized by the Left-child item is hereafter described as a Right-child pointer) It has and each node of an inclusion tree and 1 to 1 are supported. Drawing 4 is the example of the physical configuration of the inclusion tree information storage section 31 constituted on the storage region 3 based on DS 310 of the inclusion tree information storage section in the inclusion tree of drawing 2 , and when the data which correspond among the data items of DS 310 of the inclusion tree information storage section do not exist, NULL (it is 0 at an integer) is memorized by the data item here.

[0013] Drawing 5 is a flow chart which shows actuation of the retrieval processing control section in this example.

[0014] Next, actuation of the retrieval processing control section 21 in this example is explained with reference to drawing 1 and drawing 5 .

[0015] The retrieval processing control section 21 initializes the stack area for memorizing temporarily the pointer to the stereo of the administration object which receives a radix point administration object name and range assignment mode from the input section 1 and which it is not rich, and the retrieval processing control section 21 is changed into an input improper condition, is step S210, and it is as a result of retrieval, and the register field for intermediate processing intermediate treatment. Next, when the retrieval to a radix point administration object is requested and retrieval is successful at step S211 by passing a radix point administration object name to the radix point administration object retrieval section 22, the pointer to the stereo of the radix point administration object which it is as a result of retrieval, and the pointer to the node of the DS of the inclusion tree information storage section 31 corresponding to a radix point administration object are memorized to a stack area and a register field, respectively.

[0016] At step S212, when retrieval processing of the inclusion tree information storage section 31 in step S211 is successful, processing is shifted to step S213, and when retrieval processing goes wrong, processing is shifted to step S216. When the retrieval of an administration object by which range assignment was carried out by passing the pointer and range assignment mode to a node of DS of the inclusion tree information storage section 31 which are memorized by the range assignment administration object retrieval section 23 to the register field at step S213 is requested and retrieval is successful, additional storage is carried out to a stack area in the set of the pointer to the stereo of the administration object which it is as a result of retrieval and by which range assignment was carried out. At step S214, when retrieval processing of the inclusion tree information storage section 31 in step S213 was successful, processing was shifted to step S215, and when retrieval processing goes wrong, processing is shifted to step S216. At step S215, the set of the pointer to the stereo of the administration object which it is as a result of [ which is memorized in the stack area ] retrieval and by which range assignment was carried out is outputted, and the retrieval processing control section 21 is changed into the waiting state waiting for an input. At step S216, a retrieval impossible result is outputted and the retrieval processing control section 21 is changed into the waiting state waiting for an input.

[0017] Drawing 6 is a flow chart which shows the actuation of the radix point administration object Banking Inspection Department in this example.

[0018] Next, the radix point administration object retrieval section 22 actuation in this example is explained to a detail with reference to drawing 1 and drawing 6 .

[0019] The radix point administration object retrieval section 22 changes reception and the radix point administration object retrieval section 22 into an input improper condition for a radix point administration object name as an example of a relative identifier from the retrieval processing control section 21. At step S220, the example of a relative identifier is memorized to a queue field. At step S221, Pointer P is positioned in the pointer to the node of the DS corresponding to ROOT of an inclusion tree. At step S222, the 2nd register for memorizing temporarily the pointer to the stereo of the administration object which it is 1st as a result of [ which memorize temporarily one relative identifier taken out from the queue ] a register and as a result of [ retrieval ] is initialized. Here, NULL goes into

the 1st register and NULL (the administration object corresponding to ROOT does not have a stereo) goes into the 2nd register. At step S223, it judges whether a queue is empty, if it is empty, processing will be shifted to step S230, retrieval will be ended, and if a queue is not empty, processing will be shifted to step S224. At step S224, it judges whether the Left-child item of the node of the DS which Pointer P shows is NULL, and if NULL, it shifts to step S231, and it ends retrieval processing. When a Left-child item is not NULL, processing is shifted to step S225. At step S225, the Left-child pointer memorized by the Left-child item of the node to which Pointer P points is positioned in Pointer P. At step S226, one relative identifier is taken out from a queue and it puts into the 1st register. At step S227, the relative identifier memorized by the RDN item of the node to which the relative identifier memorized by the 1st register and Pointer P point is collated. If collating is successful, processing is shifted to step S223, and the same processing will be repeated until a queue becomes empty. If the Right-next item of the node to which Pointer P points judges whether it is NULL and becomes NULL about it in step S228 when collating goes wrong, processing shifts to step S231, retrieval processing is ended, when a Right-next item is not NULL, the Right-next pointer memorized by the Right-next item of a node which Pointer P shows in step S229 will be positioned in Pointer P, and processing will shift to step S227. It repeats until a relative identifier collates this.

[0020] Finally processing shifts to step S230 or step S231. At step S230, the pointer to the stereo of the radix point administration object memorized by the MO-pointer item of the node to which the value of Pointer P and Pointer P are pointing is outputted as a retrieval result, and the radix point administration object retrieval section 22 is changed into the waiting state waiting for an input. At step S231, retrieval impossible is outputted and the radix point administration object retrieval section 22 is changed into the waiting state waiting for an input.

[0021] Drawing 7 is drawing showing the flow of actuation of the whole range assignment administration object retrieval section in this example, drawing 8, and drawing 9. -- Drawing 13 is the 1st within the flow of the whole actuation shown in drawing 7, and the 2nd, respectively. -- It is the flow chart which shows the 6th actuation.

[0022] Next, they are drawing 1, drawing 7, and drawing 8 about actuation of the range assignment administration object retrieval section 23 in this example. -- It explains with reference to drawing 13.

[0023] The range assignment administration object retrieval section 23 the pointer and range assignment mode of NODOHE of the inclusion tree information storage section 31 corresponding to a radix point administration object from the retrieval processing control section 21 Reception, [ of DS ] The range assignment administration object retrieval section 23 is changed into an input improper condition, and it sets to drawing 7. At step S240 The pointer to the node of the DS of the inclusion tree information storage section 31 corresponding to a radix point administration object is positioned in Pointer P, range assignment mode is memorized to the 1st register, and range assignment level is memorized to the 2nd register. At step S241, the 1st stack which memorizes temporarily the pointer to the stereo of the administration object which it is as a result of retrieval, and by which range assignment was carried out is emptied. At step S242, processing is branched with range assignment mode.

[0024] When range assignment modes are 0 or less and 6 or more, processing is shifted to step S244 and retrieval processing is ended. At step S244, retrieval impossible is outputted and the range assignment administration object retrieval section 23 is changed into the waiting state waiting for an input.

[0025] Range assignment mode = in the case of 1, processing is shifted to step S243, and it ends retrieval processing. At step S243, the pointer to the stereo of the administration object which was memorized by the 1st stack which it is as a result of retrieval and by which range assignment was carried out is outputted, and the range assignment administration object retrieval section 23 is changed into the waiting state waiting for an input.

[0026] In the case of range assignment mode =2, in drawing 8, it processes to step S245. At step S245, it judges whether the Left-child item of a node which Pointer P shows is NULL, and if it is NULL, processing will be shifted to step S244 and retrieval processing will be ended. When a Left-child item is not NULL, processing is shifted to step S246. Step S246 positions the Left-child pointer memorized by the Left-child item of the node to which Pointer P points in Pointer P. The 1st stack is loaded with the

pointer to the stereo of the administration object memorized by the node MO-pointer item to which Pointer P points at step S247. At step S48, it judges whether the node Right-next item which Pointer P shows is NULL, and if it is NULL, processing will be shifted to step S243 and retrieval processing will be ended. When a Right-next item is not NULL, processing is shifted to step S249. At step S249, the Right-next pointer memorized by the Right-next item of the node to which Pointer P points is positioned in Pointer P, and it shifts to step S247. The pointer from a radix point administration object to the stereo of the administration object of 1 level low order can be accumulated in the 1st stack until the Right-next item of the node to which Pointer P points in step S248 is set to NULL by this.

[0027] In the case of range assignment mode =3, in drawing 9, processing is shifted to step S250. At step S250, the 2nd stack area for memorizing the value of a Right-next pointer temporarily in the middle of processing is emptied. At step S251, it judges whether the Left-child item of the node to which Pointer P points is NULL, and if it is NULL, processing will be shifted to step S243 and retrieval processing will be ended. When a Left-child item is not NULL, processing is shifted to step S252. At step S252, the Left-next pointer memorized by the Left-child item of the node to which Pointer P points is positioned in Pointer P. The 1st stack is loaded with the pointer to the stereo of the administration object memorized by the MO-pointer item of the node to which Pointer P points at step S253. The 2nd stack is loaded with the value of the Right-next pointer memorized by the Right-next item of the node to which Pointer P points at step S254.

[0028] It judges whether the Left-child item of a node which Pointer P shows is NULL, and at step S255, if it is NULL, processing is shifted to step S256, and when a Left-child item is not NULL, processing will be shifted to step S252. At step S256, it judges whether the 2nd stack is empty, and when it is empty, processing is shifted to step S243 and retrieval processing is ended. When the 2nd stack is not empty, processing is shifted to step S257. At step S257, one Right-next pointer is taken out from the 2nd stack, positioning is shifted to Pointer P and processing is shifted to step S253. Thereby, by searching a depth first, when range assignment of all the subtrees below a radix point is carried out, the pointer to the stereo of an administration object set as the object of retrieval can be accumulated in the 1st stack.

[0029] In the case of range assignment mode =4, in drawing 10, processing is shifted to step S258. At step S258, the 3rd register for memorizing in what level low order the current pointer P is located from the radix point node in the middle of processing is set to 0. When it judges "the Right-child item of the node to which Pointer P points is NULL, or the range assignment level memorized by the 2nd register is 0" and said conditions are filled with step S259, processing is shifted to step S267. When said conditions are not fulfilled, processing is shifted to step S260.

[0030] At step S267, the current level and the range assignment level which were memorized by the 3rd register are compared, when the same, processing is shifted to step S243 and retrieval processing is ended. When it differs, processing is shifted to step S244 and retrieval processing is ended.

[0031] At step S260, the value of the pointer to which the current pointer P is pointing to the 4th register is memorized. This is a pointer to the node corresponding to a radix point administration object. At step S261, the Right-child pointer memorized by the Right-child item of the node to which Pointer P points is positioned in Pointer P. At step S262, since the node which is pointing to Pointer P at said step S261 became 1 level low order, 1 \*\*\*\* of the values of the 3rd register is carried out. At step S263, the current level and the range assignment level which were memorized by the 3rd register are compared, when the same, processing is shifted to step S268, and when it differs, processing is shifted to step S264. It judges whether the Right-child item of a node which Pointer P shows is NULL, and at step S264, if it is NULL, processing is shifted to step S265, and when a Right-child item is not NULL, processing will be shifted to step S261. At step S265, it judges "whether both the Left-next items and Left-cousin items of a node to which Pointer P points are NULL(s)." When said conditions are fulfilled, processing is shifted to step S244 and retrieval processing is ended. When said conditions are not fulfilled, processing is shifted to step S266. At step S266, each pointer memorized by the Left-next item or Left-cousin item of a node to which Pointer P points is positioned in Pointer P, and processing is shifted to step S264. Here, one of the items of a Left-next item and a Left-cousin item are NULL on DS. By this, the pointer

P in the time of processing shifting to step S268 will point to the node at the right end of the cousin chain of range assignment level low order from the radix point.

[0032] In drawing 11, the pointer to which Pointer P is pointing to the 5th register now is memorized at step S268. The 3rd register is set to 0 at step S269. At step S270, Pointer P is positioned in the pointer to the node corresponding to the radix point administration object memorized by the 4th register. At step S271, the Left-child pointer memorized by the Left-child item of the node to which Pointer P points is positioned in Pointer P. At step S272, since the node which is pointing to Pointer P at step S271 became 1 level low order, 1 \*\*\*\* of the values of the 3rd register is carried out. At step S273, the current level and the range assignment level which were memorized by the 3rd register are compared, when the same, processing is shifted to step S277, and when it differs, processing is shifted to step S274. It judges whether the Left-child item of a node which Pointer P shows is NULL, and at step S274, if it is NULL, processing is shifted to step S275, and when a Left-child item is not NULL, processing will be shifted to step S271. At step S275, it judges "whether both the Right-next items and Right-cousin items of a node to which Pointer P points are NULL(s)." When said conditions are fulfilled, processing is shifted to step S244 and retrieval processing is ended. When said conditions are not fulfilled, processing is shifted to step S276.

[0033] At step S276, each pointer memorized by the Right-next item or Right-cousin item of a node to which Pointer P points is positioned in Pointer P, and processing is shifted to step S274. Here, one of the items of a Right-next item and a Right-cousin item are NULL on DS. The pointer P in the time of processing shifting to step S277 shown in drawing 12 by this will point to the node at the left end of the cousin chain of range assignment level low order from the radix point.

[0034] In drawing 12, the 1st stack is loaded with the pointer to the stereo of the administration object memorized by the MO-pointer item of the node to which Pointer P points at step S277. At step S278, the comparison with the pointer to the right end node of a cousin chain and Pointer P which are memorized by the 5th register is performed, when the same, processing is shifted to step S243 and retrieval processing is ended. When it differs, processing is shifted to step S279. Step S279 judges "whether both the Right-next items and Right-cousin items of a node to which Pointer P points are NULL(s)." When said conditions are fulfilled, processing is shifted to step S244 and retrieval processing is ended. When said conditions are not fulfilled, processing is shifted to step S280. At step S280, each pointer memorized by the Right-next item or Right-cousin item of a node to which Pointer P points is positioned in Pointer P, and processing is shifted to step S277. Here, one of the items of a Right-next item and a Right-cousin item are NULL on DS. Thereby, Pointer P can follow from a radix point to a right end node [ from the node at the left end of the cousin chain of range assignment level low order to ], and the pointer from a radix point to the stereo of the administration object of range assignment level low order can be accumulated in the 1st stack.

[0035] In the case of range assignment mode =5, in drawing 13, processing is shifted to step S281. At step S281, the node to which it pointed with the 2nd stack area and its Right-next pointer for memorizing the value of a Right-next pointer temporarily in the middle of processing empties the 3rd stack area which memorizes the node of what level low order it is from a radix point. Moreover, the 3rd register for memorizing in what level low order current and Pointer P are located from the radix point node in the middle of processing and the 6th register for memorizing to [ from a radix point node ] what level low order Pointer P followed the pointer until it resulted in current are set to 0.

[0036] When it judges whether it is "the range assignment level memorized by whether the Left-child item of a node which Pointer P shows is NULL, and the 2nd register is 0" and said conditions are filled with step S282, processing is shifted to step S293. When said conditions are not fulfilled, processing is shifted to step S283. At step S293, the current level and the range assignment level which were memorized by the 6th register are compared, when the same, processing is shifted to step S243 and retrieval processing is ended. When it differs, processing is shifted to step S244 and retrieval processing is ended. At step S283, the Left-child pointer memorized by the Left-child item of the node to which Pointer P points is positioned in Pointer P.

[0037] At step S284, since the node which is pointing to Pointer P at said step S283 became 1 level low

order, 1 \*\*\*\* of the values of the 3rd register is carried out. When judging whether it is "larger [ the value of the 3rd register ] than the 6th register" and filling said conditions with step S285, processing is shifted to step S286, and when not fulfilling said conditions, processing is shifted to step S287.

[0038] The 6th register is made into the value memorized by the 3rd register at step S286. The 1st stack is loaded with the pointer to the stereo of the administration object memorized by the MO-pointer item of the node to which Pointer P points at step S287. At step S288, the 2nd stack is loaded with the value of the Right-next pointer memorized by the Right-next item of the node to which Pointer P points, and the 3rd stack is loaded with the value of the 3rd register.

[0039] When judging whether it is "equal [ the value of whether the Left-child item of a node which Pointer P shows is NULL, and the 3rd register, and the value of the 2nd register ]" and filling said conditions with step S289, processing is shifted to step S290, and when not fulfilling said conditions, processing is shifted to step S283. At step S290, it judges whether the 2nd stack is empty, when it is empty, processing is shifted to step S293, and when it is not empty, processing is shifted to step S291. At step S291, one Right-next pointer is taken out from the 2nd stack, and it positions in Pointer P. At step S292, it is made the value which took out the value of the 3rd register from the 3rd stack, and processing is shifted to step S287. The pointer to the stereo of the administration object of the subtree from a radix point to range assignment level low order can be accumulated in the 1st stack by this performing retrieval [ depth first / to range assignment level ].

[0040]

[Effect of the Invention] The inclusion tree information storage section which memorized the information on an inclusion tree [ in / in this invention / a network management system ] as explained above, The retrieval processing control section which controls the retrieval processing corresponding to the radix point administration object name and range assignment mode which are given from the input section, The radix point administration object retrieval section which reads the 2nd pointer in which the location of the stereo of the administration object memorized by the 1st pointer in which the location of the node of the inclusion tree information storage section corresponding to the radix point administration object name acquired in this retrieval processing control section is shown, and its node is shown, In the 1st pointer and retrieval processing control section which show the location of the node of the inclusion tree information storage section corresponding to the radix point administration object name acquired in this radix point administration object retrieval section It has the range assignment administration object retrieval section which reads the 3rd pointer in which the location of the stereo of two or more administration objects corresponding to the obtained range assignment mode is shown. Moreover, the left-NEKISUTO (Left-next) item and light-NEKISUTO (Right-next) item by which the inclusion tree information storage section connects a child node with the same parent node bidirectionally for the inclusion relation in the inclusion tree of an administration object with the chain of the 4th pointer, The left-cousin (Left-cousin) item and light-cousin (Right-cousin) item which connect bidirectionally two or more chains bidirectionally connected with the 4th pointer on the same level in an inclusion tree with the chain of the 5th pointer, By having DS including the left-chilled (Left-child) item and light-chilled (Right-child) item which memorize the 6th pointer to the both-ends administration object of the chain of a child administration object in a parent administration object In an inclusion tree, since the nodes via which it will go by the time it results in the node of n level low order of the subtree which uses a radix point as a root are reduced, compared with the former, processing cost is reducible.

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**TECHNICAL FIELD**

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[Industrial Application] Especially this invention relates to the administration object retrieval processor in the network management system of the OSI managed model of open systems interconnection (it is hereafter described as OSI) about an administration object retrieval processor.

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**PRIOR ART**

[Description of the Prior Art] Two or more pair optional feature made into the object of processing of the management information (it is hereafter described as an administration object) by which range assignment was carried out as a functional unit of the common management information service (it is hereafter described as CMIS) of OSI management exists. Range assignment is on the tree (it is hereafter described as an inclusion tree) for managing the identifier of the administration object in a system uniquely hierarchical, As opposed to the subtree which uses a radix point as a root on the basis of one node of arbitration "Only a radix point" Only (it is hereafter described as the range assignment mode 1), and "the node of a radix point to 1 level low order" (It is hereafter described as the range assignment mode 2), "the node of all the subtrees containing a radix point" The range assignment mode of (it is hereafter described as the range assignment mode 3), "the node of a radix point to n level low order" (it is hereafter described as the range assignment mode 4), and "the node of the subtree to n level low order containing a radix point" (it is hereafter described as the range assignment mode 5) exists.  
[0003] Conventionally, this kind of administration object retrieval processor makes an input value the radix point identifier and range assignment mode which show a radix point for the retrieval to the node by which range assignment was carried out as mentioned above, First, it had become the configuration performed hierarchical from a radix point also to the node to which the inclusion tree searched originally inclusion Kigami's node specified by the radix point identifier hierarchical, next the above-mentioned range assignment was carried out on the subtree below a radix point.

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**EFFECT OF THE INVENTION**

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[Effect of the Invention] The inclusion tree information storage section which memorized the information on the inclusion tree in a network management system in this invention as explained above, The retrieval processing control section which controls the retrieval processing corresponding to the radix point administration object name and range assignment mode which are given from the input section, The radix point administration object retrieval section which reads the 2nd pointer in which the location of the stereo of the administration object memorized by the 1st pointer in which the location of the node of the inclusion tree information storage section corresponding to the radix point administration object name acquired in this retrieval processing control section is shown, and its node is shown, In the 1st pointer and retrieval processing control section which show the location of the node of the inclusion tree information storage section corresponding to the radix point administration object name acquired in this radix point administration object retrieval section It has the range assignment administration object retrieval section which reads the 3rd pointer in which the location of the stereo of two or more administration objects corresponding to the obtained range assignment mode is shown. Moreover, the left-NEKISUTO (Left-next) item and light-NEKISUTO (Right-next) item by which the inclusion tree information storage section connects a child node with the same parent node bidirectionally for the inclusion relation in the inclusion tree of an administration object with the chain of the 4th pointer, The left-cousin (Left-cousin) item and light-cousin (Right-cousin) item which connect bidirectionally two or more chains bidirectionally connected with the 4th pointer on the same level in an inclusion tree with the chain of the 5th pointer, By having DS including the left-chilled (Left-child) item and light-chilled (Right-child) item which memorize the 6th pointer to the both-ends administration object of the chain of a child administration object in a parent administration object In an inclusion tree, the nodes via which it will go by the time it results in the node of n level low order of the subtree which uses a radix point as a root are reduced. Therefore, compared with the former, processing cost is reducible.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] Since it needed to refer to this conventional administration object retrieval processor by inclusion Kigami in the retrieval in the case of the range assignment mode 4 via all the nodes to n level low order of the subtree which uses a radix point as a root, there was a trouble that the processing time started too much.

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**MEANS**

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[Means for Solving the Problem] The inclusion tree information storage section which memorized the information on an inclusion tree [ in / in the administration object retrieval processor of this invention / a network management system ], The retrieval processing control section which controls the retrieval processing corresponding to the radix point administration object name and range assignment mode which are given from the input section, The radix point administration object retrieval section which reads the 2nd pointer in which the location of the stereo of the administration object memorized by the 1st pointer in which the location of the node of said inclusion tree information storage section corresponding to said radix point administration object name acquired in this retrieval processing control section is shown, and its node is shown, In said 1st pointer in which the location of the node of said inclusion tree information storage section corresponding to said radix point administration object name acquired in this radix point administration object retrieval section is shown, and said retrieval processing control section It has the range assignment administration object retrieval section which reads the 3rd pointer in which the location of the stereo of two or more administration objects corresponding to said obtained range assignment mode is shown.

[0006] The administration object retrieval processor of this invention moreover, said inclusion tree information storage section The left-NEKISUTO (Left-next) item and light-NEKISUTO (Right-next) item by which a parent node connects the same child node bidirectionally for the inclusion relation in the inclusion tree of an administration object with the chain of the 4th pointer, The left-cousin (Left-cousin) item and light-cousin (Right-cousin) item which connect bidirectionally two or more chains bidirectionally connected with said 4th pointer on the same level in said inclusion tree with the chain of the 5th pointer, It has DS including the left-chilled (Left-child) item and light-chilled (Right-child) item which memorize the 6th pointer to the both-ends administration object of the chain of a child administration object in a parent administration object.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing one example of this invention.

[Drawing 2] It is drawing showing the inclusion tree of the administration object in this example.

[Drawing 3] It is drawing showing the DS of the inclusion tree information storage section in this example.

[Drawing 4] It is drawing showing the physical configuration of the inclusion tree information storage section in this example.

[Drawing 5] It is the flow chart which shows actuation of the retrieval processing control section in this example.

[Drawing 6] It is the flow chart which shows actuation of the radix point administration object retrieval section in this example.

[Drawing 7] It is drawing showing the flow of actuation of the whole range assignment administration object retrieval section in this example.

[Drawing 8] It is the flow chart which shows the 1st actuation within the flow of the whole actuation shown in drawing 7.

[Drawing 9] It is the flow chart which shows the 2nd actuation within the flow of the whole actuation shown in drawing 7.

[Drawing 10] It is the flow chart which shows the 3rd actuation within the flow of the whole actuation shown in drawing 7.

[Drawing 11] It is the flow chart which shows the 4th actuation within the flow of the whole actuation shown in drawing 7.

[Drawing 12] It is the flow chart which shows the 5th actuation within the flow of the whole actuation shown in drawing 7.

[Drawing 13] It is the flow chart which shows the 6th actuation within the flow of the whole actuation shown in drawing 7.

[Description of Notations]

1 Input Section

2 Administration Object Retrieval Processing Section

3 Storage Region

4 Output Section

21 Retrieval Processing Control Section

22 Radix Point Administration Object Retrieval Section

23 Range Assignment Administration Object Retrieval Section

31 Inclusion Tree Information Storage Section

310 DS of Inclusion Tree Information Storage Section

320-333 DS of the inclusion tree information storage section

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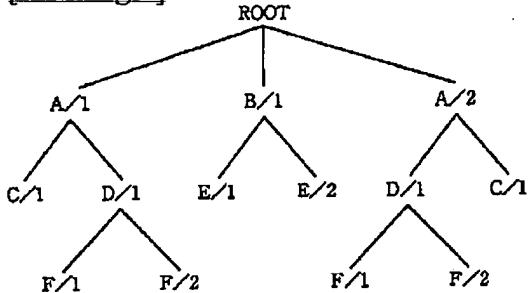
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DRAWINGS

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[Drawing 2]

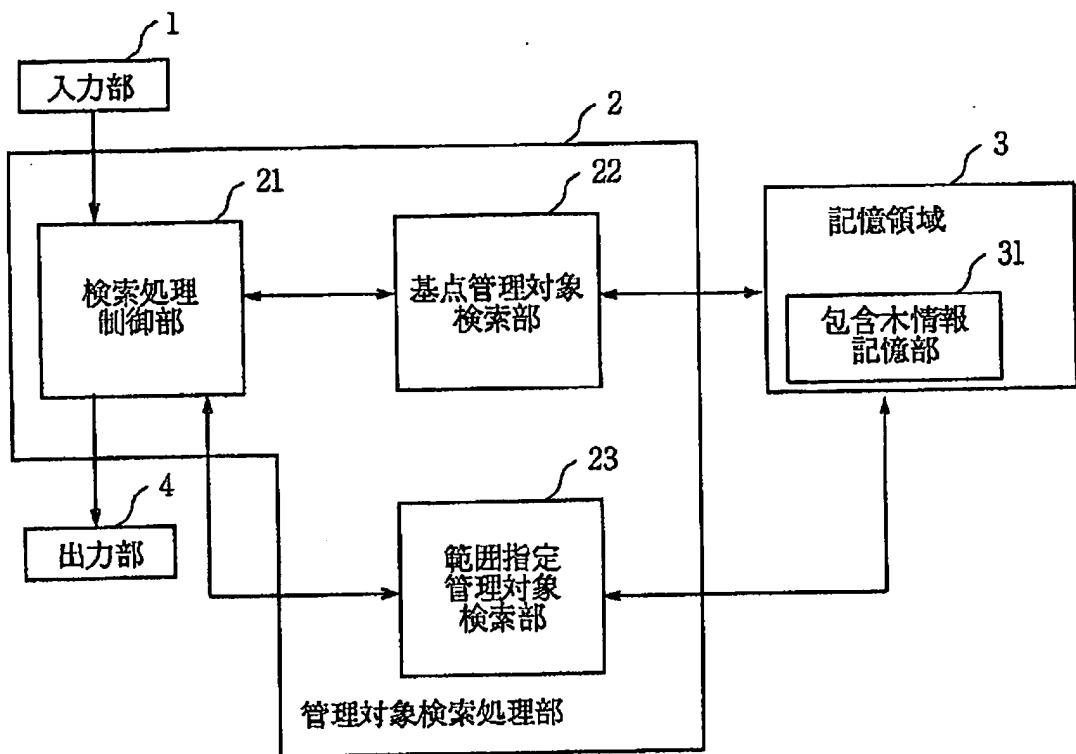


[Drawing 3]

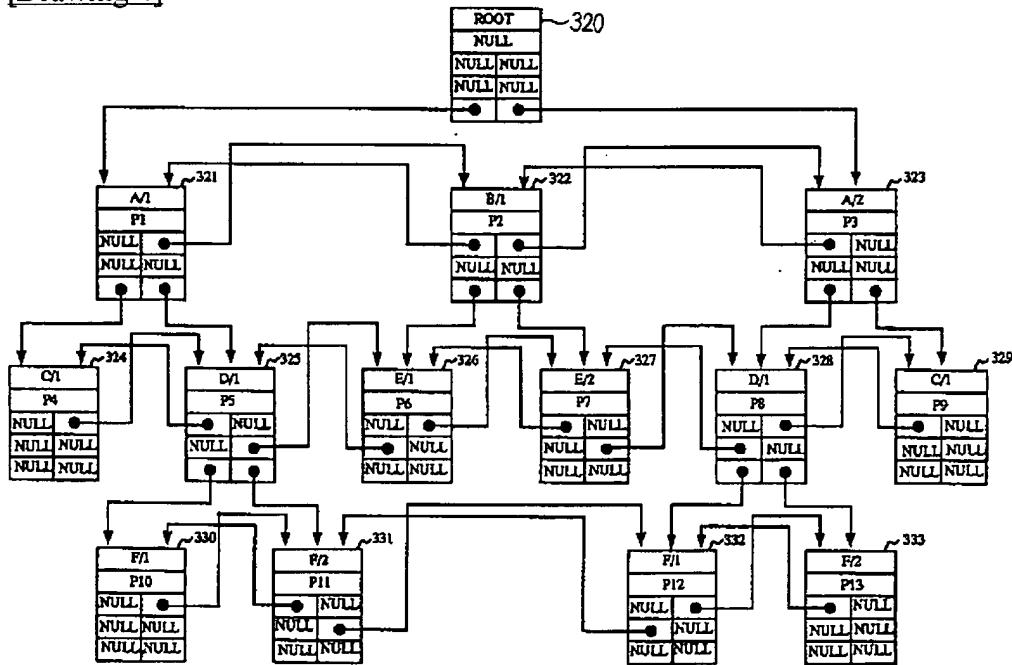
310

RDN	
MO-pointer	
Left-next	Right-next
Left-cousin	Right-cousin
Left-child	Right-child

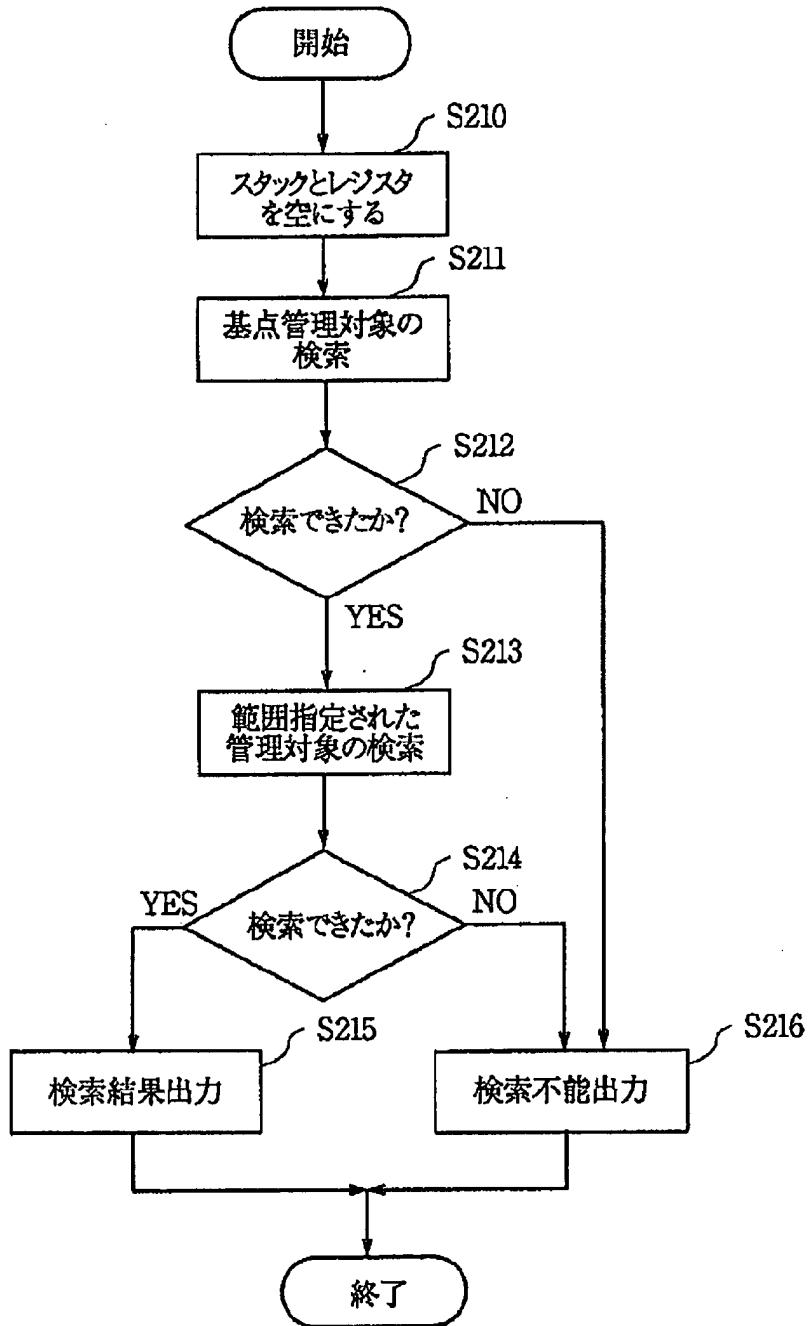
[Drawing 1]



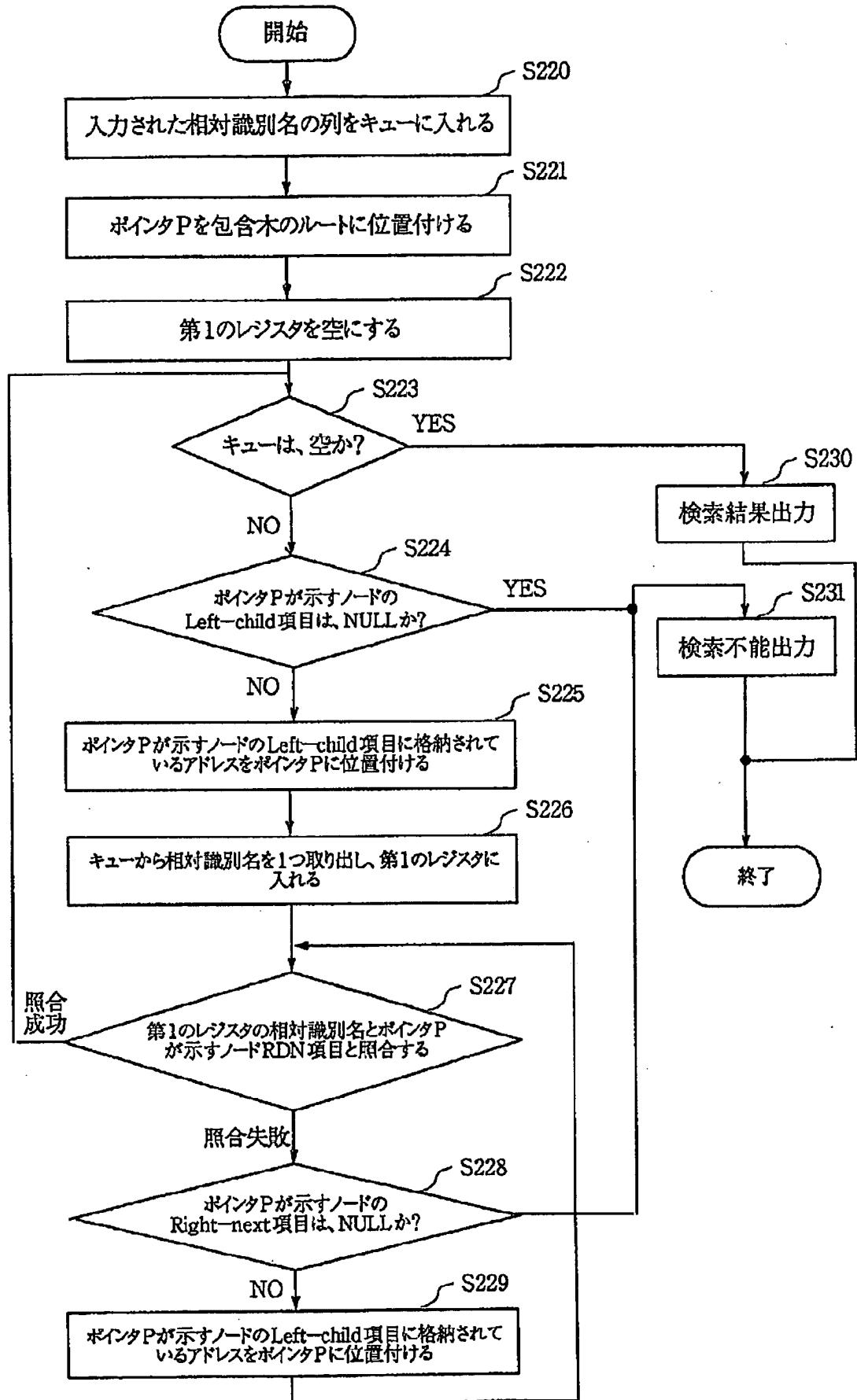
[Drawing 4]



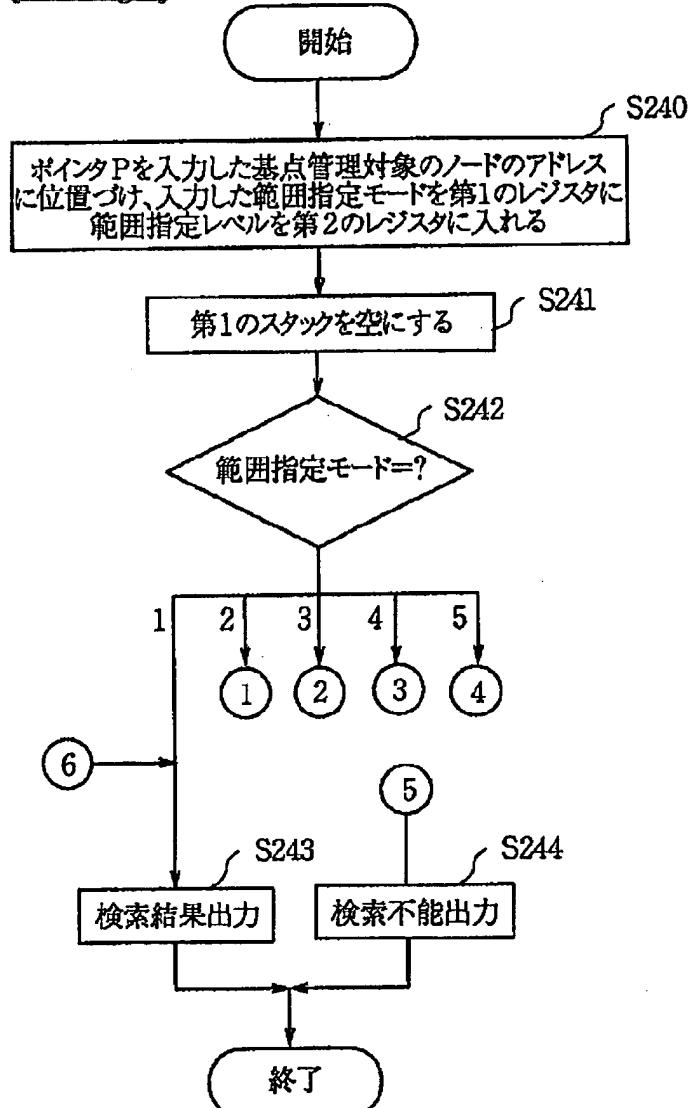
[Drawing 5]



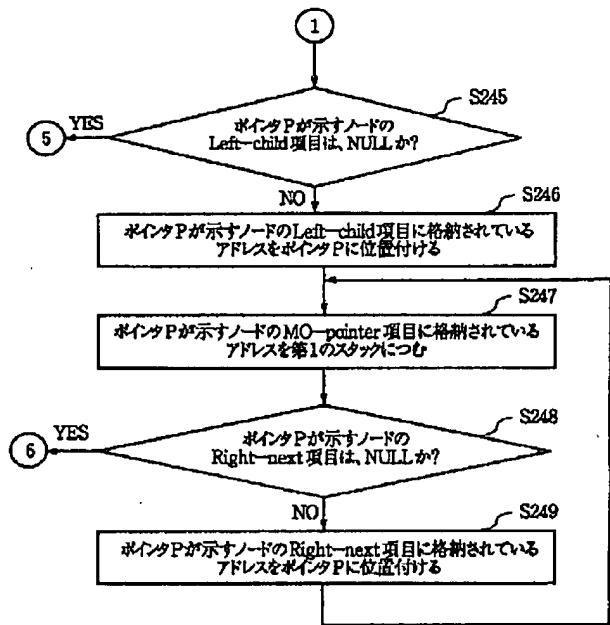
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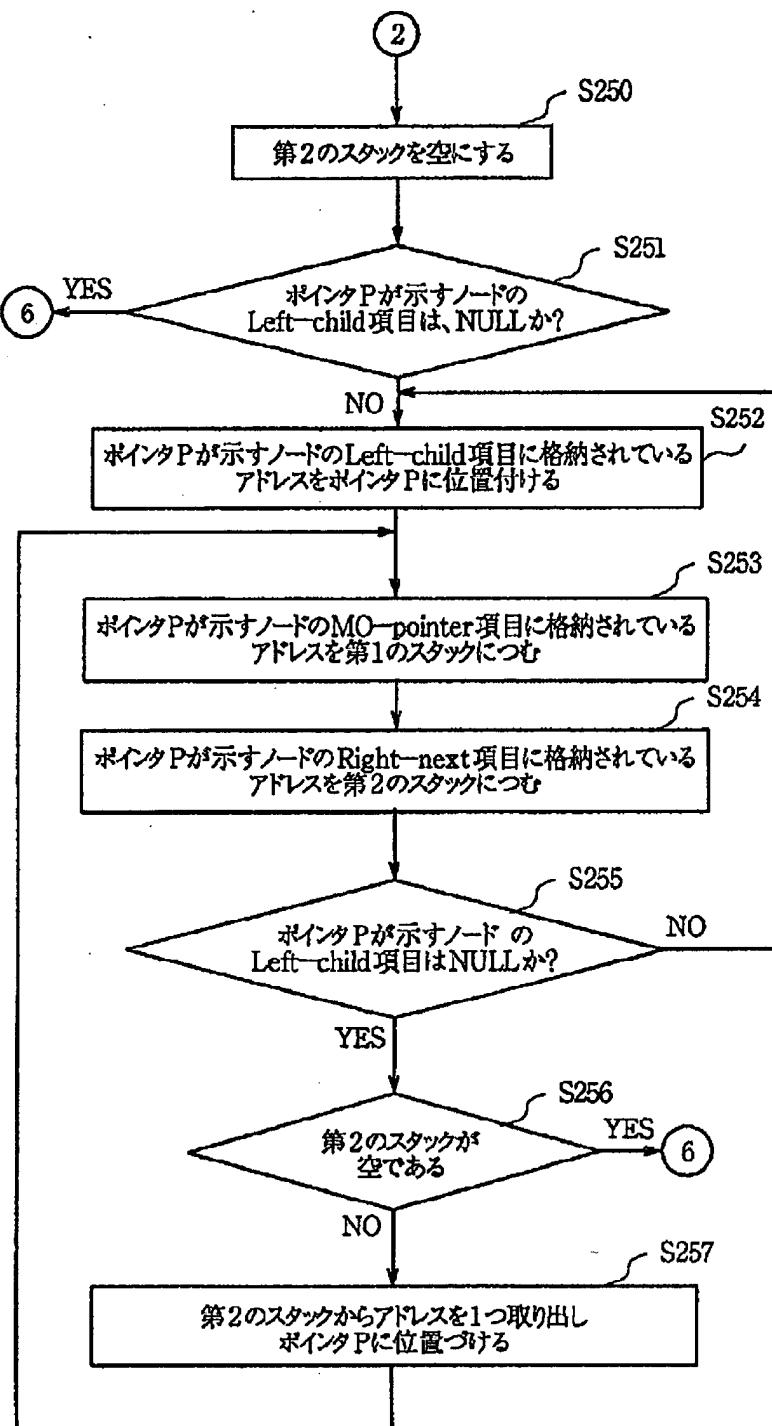
[Drawing 7]



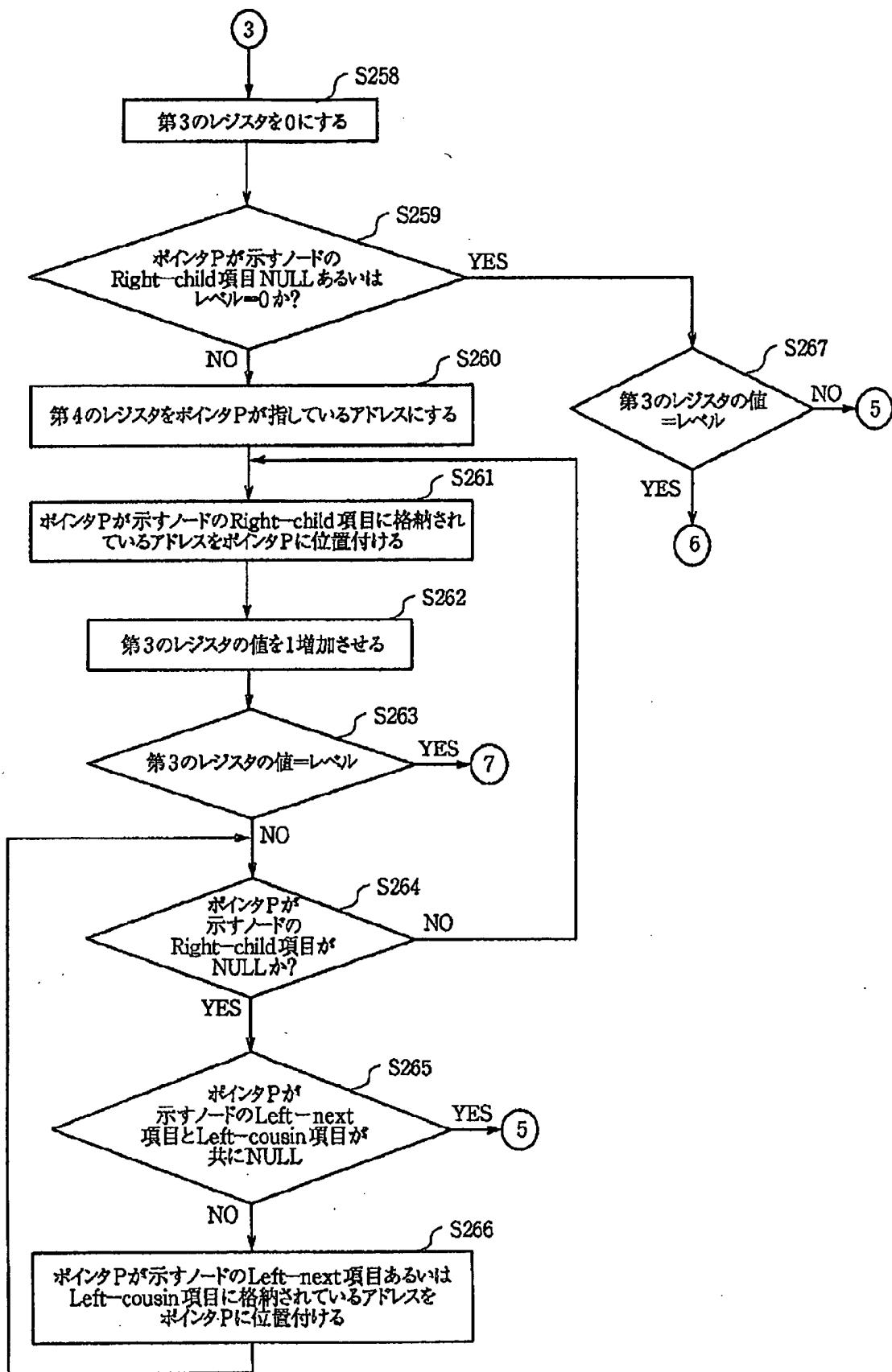
[Drawing 8]



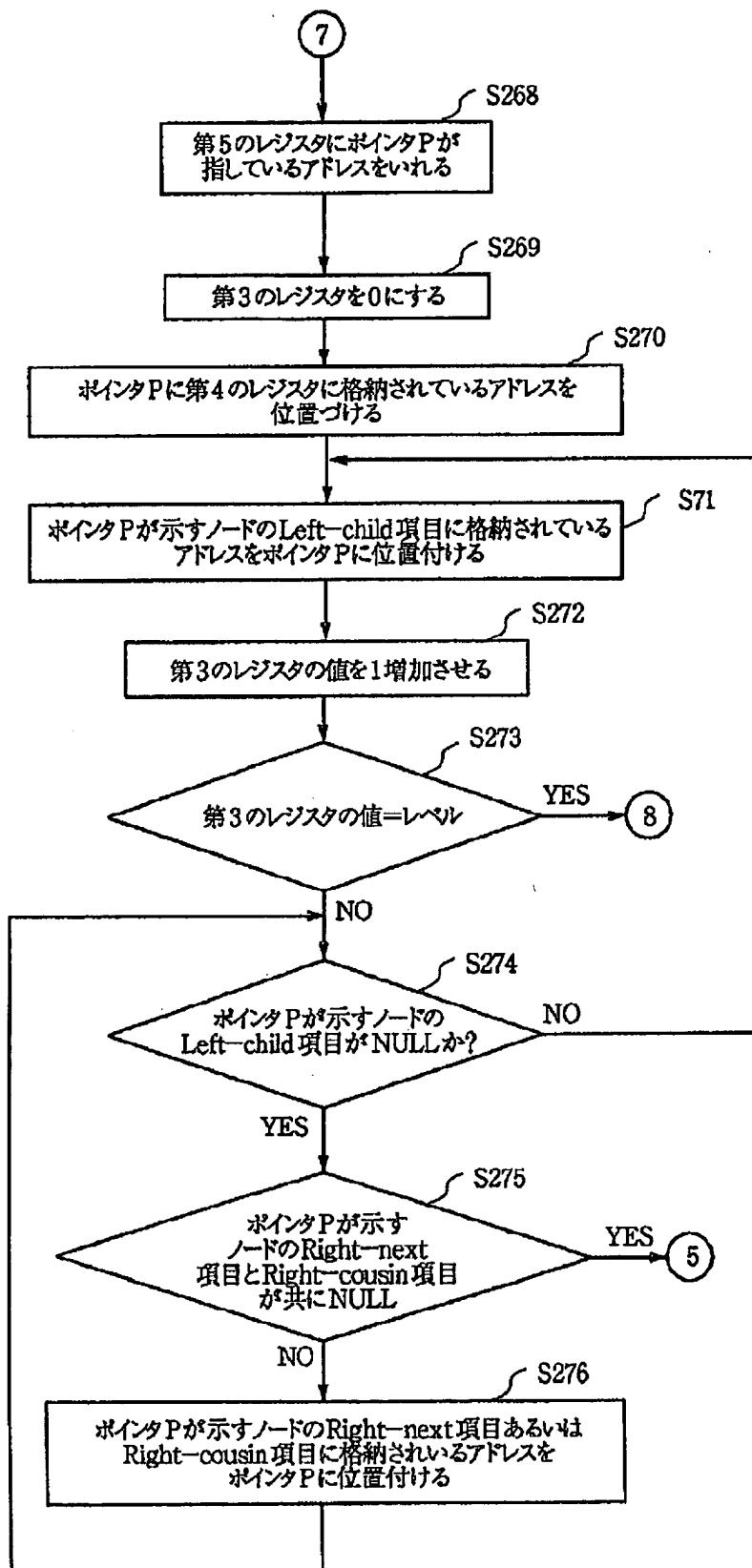
[Drawing 9]



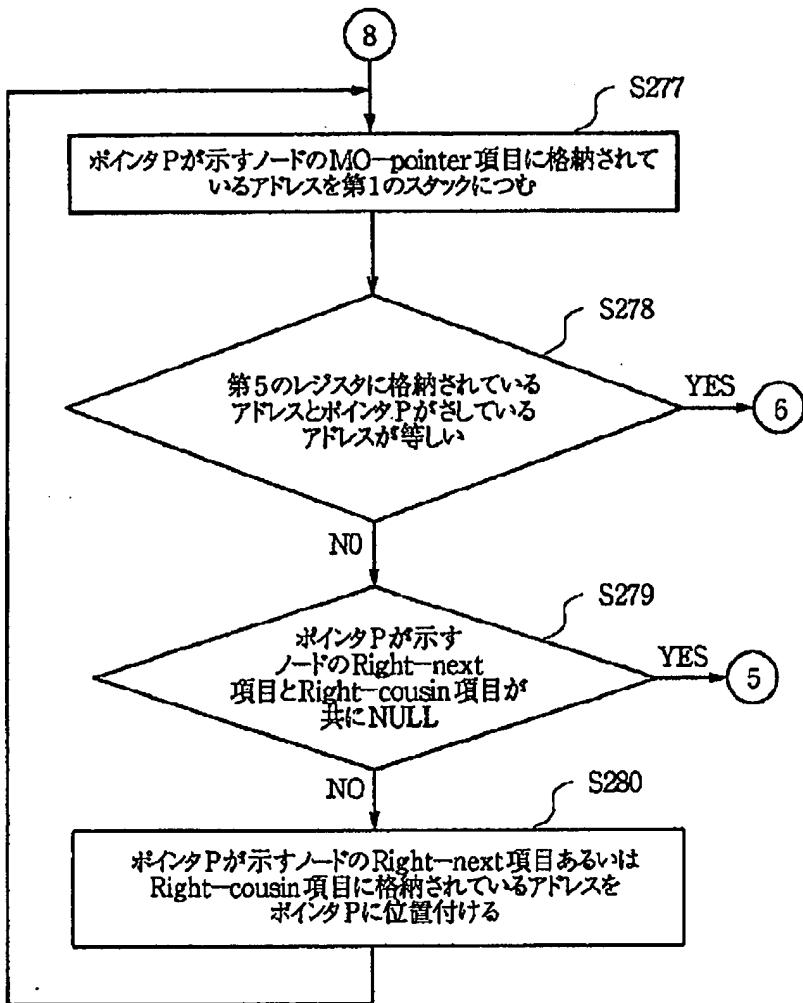
[Drawing 10]



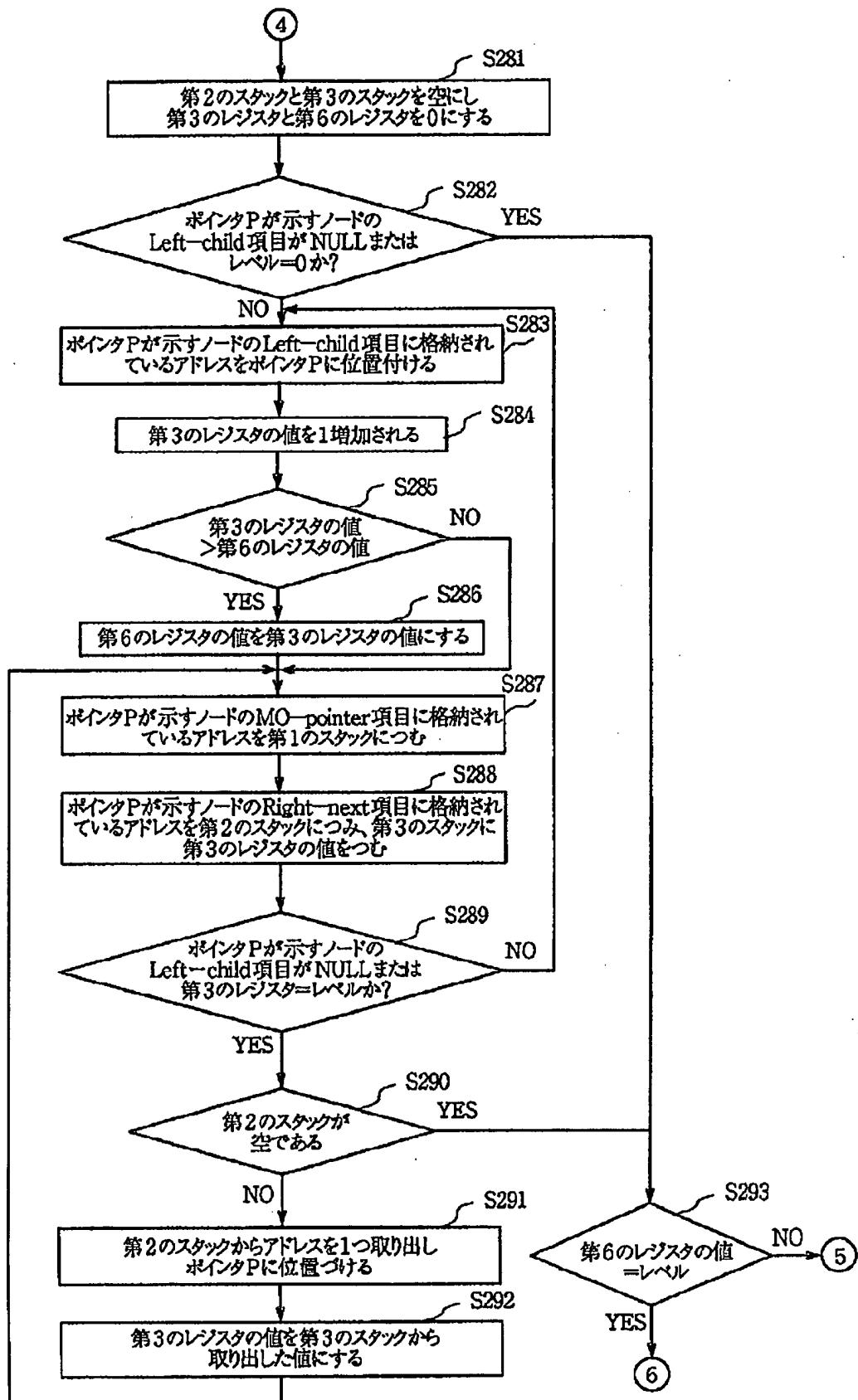
[Drawing 11]



[Drawing 12]



[Drawing 13]



[Translation done.]